IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	H. Nakamura et al.	: Art Unit:
Serial No.:	To Be Assigned	: Examiner:
Filed:	Herewith	:
For:	ANTENNA DUPLEXER AND MOBILE COMMUNICATION DEVICE USING THE SAME	:

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, DC 20231

S I R :

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Please replace the section beginning at page 4, line 4:

One aspect of the present invention is an antenna duplexer comprising:

Please replace the section beginning at page 5, line 3:

Another aspect of the present invention is an antenna duplexer comprising:

Please replace the section beginning at page 6, line 4:

Still another aspect of the present invention is the antenna duplexer, wherein said transmitting filter is a composite filter,

Please replace the section beginning at page 6, line 15:

Yet still another aspect of the present invention is the antenna duplexer comprising a constitution employing a laminated filter which uses a dielectric green sheet,

Please replace the paragraph beginning at page 7, line 1:

Still yet another aspect of the present invention is the antenna duplexer, wherein said receiving filter is an surface acoustic wave filter.

Please replace the paragraph beginning at page 7, line 4:

A further aspect of the present invention is the antenna duplexer, wherein said receiving filter is the composite filter.

Please replace the section beginning at page 7, line 8:

A still further aspect of the present invention is the antenna duplexer, wherein, at said simultaneous transmission and reception time,

Please replace the paragraph beginning at page 7, line 14:

A yet further aspect of the present invention is the antenna duplexer, wherein adjustment to raise the output level of said transmitting amplifier is performed by increasing a power source voltage of said transmitting amplifier.

Please replace the section beginning at page 7, line 19:

A still yet further aspect of the present invention is the antenna duplexer, wherein said composite filter has an input terminal, an output terminal, at least one transmitting circuit and at least not less than one switching notch filter,

Please replace the section beginning at page 8, line 13:

An additional aspect of the present invention is the antenna duplexer, wherein, when said switch is in an ON state, a passing characteristic from said input terminal to said output terminal is a characteristic superposed with the characteristic having the attenuation pole formed by the characteristic of said transmitting circuit and said series resonance circuit of said switching notch filter,

Please replace the paragraph beginning at page 9, line 1:

A still additional aspect of the present invention is the antenna duplexer, wherein said transmitting circuit is constituted by a circuit having a filter function.

Please replace the section beginning at page 9, line 5:

A yet additional aspect of the present invention is the antenna duplexer, wherein said transmitting circuit is constituted by a serial connection of capacitors.

Please replace the section beginning at page 9, line 8:

A yet additional aspect of the present invention is the antenna duplexer, wherein said transmitting circuit is constituted by a strip line.

Please replace the section beginning at page 9, line 11:

A supplementary aspect of the present invention is the antenna duplexer, wherein said antenna duplexer has a constitution employing a laminated filter which uses a dielectric green sheet,

Please replace the paragraph beginning at page 9, line 19:

A still supplementary aspect of the present invention is the antenna duplexer, wherein said antenna switch is integrated with another switch connected to said antenna terminal.

Please replace the paragraph beginning at page 9, line 23:

A yet supplementary aspect of the present invention is the antenna duplexer, wherein, at said simultaneous transmission and reception time, by the same control signal, said antenna switch performs an operation to electrically connect said antenna terminal, said one side terminal and said other side terminal of said antenna terminal and an operation to turn ON a switch of the switching notch filter of said composite filter.

Please replace the paragraph beginning at page 10, line 7:

A still yet supplementary aspect of the present invention is the antenna, wherein, at said non-simultaneous transmission and reception time, by the same control signal, said antenna switch performs by time division an operation to handle individually the electrical connection with said one side terminal or said other side terminal from said antenna terminal and an operation to turn OFF a switch of said switching notch filter of said composite filter.

Please replace the paragraph beginning at page 10, line 15:

One aspect of the present invention is the antenna duplexer, wherein, when said switch is turned ON, said series resonance circuit attains a characteristic having the attenuation pole and, when said switch is turned OFF, said series resonance circuit is electrically separated in a channel from said input terminal to said output terminal, and the passing characteristic from said input terminal to said output terminal attains a substantially same characteristic as the transmitting circuit.

Please replace the paragraph beginning at page 11, line 1:

Another aspect of the present invention is the antenna duplexer, wherein a FET is used for said switch.

Please replace the paragraph beginning at page 11, line 4:

Still another aspect of the present invention is the antenna duplexer, wherein a pin diode is used for said switch.

Please replace the paragraph beginning at page 11, line 7:

Yet still another aspect of the present invention is the antenna duplexer, wherein a pin diode and a quarter wave length line are used for said switch.

Please replace the paragraph beginning at page 11, line 10:

Still yet another aspect of the present invention is the antenna duplexer, wherein said series resonance circuit has a constitution in which a capacitor and a resonator are connected in series.

Please replace the paragraph beginning at page 11, line 14:

A further aspect of the present invention is the antenna duplexer, wherein said series resonance circuit has a constitution in which an inductor and the resonator are connected in series.

Please replace the paragraph beginning at page 11, line 18:

A still further aspect of the present invention is the antenna duplexer, wherein said series resonance circuit has a constitution in which a circuit consisting of a capacitor and inductor connected in parallel and the resonator connected are connected in series.

Please replace the section beginning at page 11, line 23:

A yet further aspect of the present invention is the antenna duplexer, wherein said composite filter has an input terminal, an output terminal, at least one transmitting circuit and at least not less than one switching notch filter,

Please replace the section beginning at page 12, line 16:

A still yet further aspect of the present invention is the antenna duplexer, wherein said composite filter has an input terminal, an output terminal, and more than at least one switching notch filter connected to said input terminal and said output terminal,

Please replace the paragraph beginning at page 13, line 7:

An additional aspect of the present invention is the antenna duplexer, wherein said notch filter consists of a parallel resonant circuit.

Please replace the paragraph beginning at page 13, line 10:

A still additional aspect of the present invention is the antenna duplexer, wherein said notch filter is an surface acoustic wave filter.

Please replace the section beginning at page 13, line 13:

A yet additional aspect of the present invention is a mobile communication device corresponding to simultaneous transmission and reception which simultaneously performs transmission and reception and non simultaneous transmission and reception which does not simultaneously perform transmission and reception comprising:

Please replace the section beginning at page 13, line 22:

A still yet additional aspect of the present invention is the mobile communication device corresponding to simultaneous transmission and reception which simultaneously performs transmission and reception and non-simultaneous transmission and reception which does not simultaneously perform transmission and reception,

Please replace the section beginning at page 14, line 10:

wherein the antenna duplexer is used for said antenna connection circuit.

IN THE CLAIMS:

Please replace claims 9, 15, and 25 with the following amended claims:

9. (As Amended) The antenna duplexer according to any of claims 1or 3, wherein said composite filter has an input terminal, an output terminal, at least one transmitting circuit and at least not less than one switching notch filter,

said transmitting circuit is electrically connected between said input terminal and said output terminal,

said switching notch filter is connected to at least either one of the input side and output side of said transmitting circuit,

said switching notch filter has at least one switch and at least one series resonance circuit,

one end of said switch is connected between said input terminal and said output terminal,

the other end of said switch is connected to one end of said series resonance circuit, and

said switch has a control terminal to switch ON/OFF.

15. (As Amended) The antenna duplexer according to claims 2 or 3, wherein said antenna switch is integrated with another switch connected to said antenna terminal.

25. (As Amended) The antenna duplexer according to any of claims 1or 3, wherein said composite filter has an input terminal, an output terminal, at least one transmitting circuit and at least not less than one switching notch filter,

Respectfully Submitted,

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Attorney for Applicants

AR/lm
Enclosure: Version With Markings Showing Changes Made
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The Assistant Commissioner for Patents is hereby authorized to charge payment to Deposit Account No. 18-0350 of any fees associated with this communication.

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I hereby certify that this paper and fee are being deposited, under 37 C.F.R. § 1.10 and with sufficient postage, using the "Express Mail Post Office to Addressee" service of the United States Postal Service on the date indicated above and that the deposit is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Kathleen Libby

VERSION WITH MARKINGS TO SHOW CHANGES MADE

SPECIFICATION:

Specification at page 4, line 4:

~~The 1st invention~~ One aspect of the present invention is an antenna duplexer comprising:

Specification at page 5, line 3:

~~The 2nd invention~~ Another aspect of the present invention is an antenna duplexer comprising:

Specification at page 6, line 4:

~~The 3rd invention~~ Still another aspect of the present invention is the antenna duplexer ~~according to 2nd invention~~, wherein said transmitting filter is a composite filter,

Specification at page 6, line 15:

~~The 4th invention~~ Yet still another aspect of the present invention is the antenna duplexer ~~according to any one of 1st to 3rd inventions~~ comprising a constitution employing a laminated filter which uses a dielectric green sheet,

Specification at page 7, line 1:

~~The 5th invention~~ Still yet another aspect of the present invention is the antenna duplexer ~~according to any one of 1st to 3rd inventions~~, wherein said receiving filter is an surface acoustic -wave filter.

Specification at page 7, line 4:

~~The 6th invention~~ A further aspect of the present invention is the antenna duplexer ~~according to 2nd or 3rd inventions~~, wherein said receiving filter is the composite filter ~~according to 3rd invention~~.

Specification at page 7, line 8:

~~The 7th invention~~ A still further aspect of the present invention is the antenna duplexer ~~according to 2nd or 3rd inventions~~, wherein, at said simultaneous transmission and reception time,

Specification at page 7, line 14:

~~The 8th invention~~ A yet further aspect of the present invention is the antenna duplexer ~~according to 7th invention~~, wherein adjustment to raise the output level of said transmitting amplifier is performed by increasing a power source voltage of said transmitting amplifier.

Specification at page 7, line 19:

~~The 9th invention~~ A still yet further aspect of the present invention is the antenna duplexer ~~according to any of 1st, 3rd, 5th, 6th inventions~~, wherein said composite filter has an input terminal, an output terminal, at least one transmitting circuit and at least not less than one switching notch filter,

Specification at page 8, line 13:

~~The 10th invention~~ An additional aspect of the present invention is the antenna duplexer ~~according to 9th invention~~, wherein, when said switch is in an ON state, a passing characteristic from said input terminal to said output terminal is a characteristic superposed with the characteristic having the attenuation pole formed by the characteristic of said transmitting circuit and said series resonance circuit of said switching notch filter,

Specification at page 9, line 1:

~~The 11th invention~~ A still additional aspect of the present invention is the antenna duplexer ~~according to 10th invention~~, wherein said transmitting circuit is constituted by a circuit having a filter function.

Specification at page 9, line 5:

~~The 12th invention~~ A yet additional aspect of the present invention is the antenna duplexer ~~according to 9th invention~~, wherein said transmitting circuit is constituted by a serial connection of capacitors.

Specification at page 9, line 8:

~~The 13th invention~~ A yet additional aspect of the present invention is the antenna duplexer ~~according to 9th invention~~, wherein said transmitting circuit is constituted by a strip line.

Specification at page 9, line 11:

~~The 14th invention~~ A supplementary aspect of the present invention is the antenna duplexer ~~according to 9th invention~~, wherein said antenna duplexer has a constitution employing a laminated filter which uses a dielectric green sheet,

Specification at page 9, line 19:

~~The 15th invention~~ A still supplementary aspect of the present invention is the antenna duplexer ~~according to 2nd or 3rd inventions~~, wherein said antenna switch is integrated with another switch connected to said antenna terminal.

Specification at page 9, line 23:

~~The 16th invention~~ A yet supplementary aspect of the present invention is the antenna duplexer ~~according to 9th invention~~, wherein, at said simultaneous transmission and reception time, by the same control signal, said antenna switch performs an operation to electrically connect said antenna terminal, said one side terminal and said other side terminal of said antenna terminal and an operation to turn ON a switch of the switching notch filter of said composite filter.

Specification at page 10, line 7:

~~The 17th invention~~ A still yet supplementary aspect of the present invention is the antenna ~~duplexer according to 9th invention~~, wherein, at said non-simultaneous transmission and reception time, by the same control signal, said antenna switch performs by time division an operation to handle individually the

electrical connection with said one side terminal or said other side terminal from said antenna terminal and an operation to turn OFF a switch of said switching notch filter of said composite filter.

Specification at page 10, line 15:

~~The 18th invention~~ One aspect of the present invention is the antenna duplexer ~~according to 9th invention~~, wherein, when said switch is turned ON, said series resonance circuit attains a characteristic having the attenuation pole and, when said switch is turned OFF, said series resonance circuit is electrically separated in a channel from said input terminal to said output terminal, and the passing characteristic from said input terminal to said output terminal attains a substantially same characteristic as the transmitting circuit.

Specification at page 11, line 1:

~~The 19th invention~~ Another aspect of the present invention is the antenna duplexer ~~according to 9th invention~~, wherein a FET is used for said switch.

Specification at page 11, line 4:

~~The 20th invention~~ Still another aspect of the present invention is the antenna duplexer ~~according to 9th invention~~, wherein a pin diode is used for said switch.

Specification at page 11, line 7:

~~The 21st invention~~ Yet still another aspect of the present invention is the antenna duplexer ~~according to 9th invention~~, wherein a pin diode and a quarter wave length line are used for said switch.

Specification at page 11, line 10:

~~The 22nd invention~~ Still yet another aspect of the present invention is the antenna duplexer ~~according to 9th invention~~, wherein said series resonance circuit has a constitution in which a capacitor and a resonator are connected in series.

Specification at page 11, line 14:

~~The 23rd invention~~ A further aspect of the present invention is the antenna duplexer ~~according to 9th invention~~, wherein said series resonance circuit has a constitution in which an inductor and the resonator are connected in series.

Specification at page 11, line 18:

~~The 24th invention~~ A still further aspect of the present invention is the antenna duplexer ~~according to 9th invention~~, wherein said series resonance circuit has a constitution in which a circuit consisting of a capacitor and inductor connected in parallel and the resonator connected are connected in series.

Specification at page 11, line 23:

~~The 25th invention~~ A yet further aspect of the present invention is the antenna duplexer ~~according to any of 1st, 3rd, 5th , 6th inventions~~, wherein said composite filter has an input terminal, an output terminal, at least one transmitting circuit and at least not less than one switching notch filter,

Specification at page 12, line 16:

~~The 26th invention~~ A still yet further aspect of the present invention is the antenna duplexer ~~according to 9th invention~~, wherein said composite filter has an input terminal, an output terminal, and more than at least one switching notch filter connected to said input terminal and said output terminal,

Specification at page 13, line 7:

~~The 27th invention~~ An additional aspect of the present invention is the antenna duplexer ~~according to 26th invention~~, wherein said notch filter consists of a parallel resonant circuit.

Specification at page 13, line 10:

~~The 28th invention~~ A still additional aspect of the present invention is the antenna duplexer ~~according to 26th invention~~, wherein said notch filter is an surface acoustic wave filter.

Specification at page 13, line 13:

~~The 29th invention~~ A yet additional aspect of the present invention is a mobile communication device corresponding to simultaneous transmission and reception which simultaneously performs transmission and reception and non simultaneous transmission and reception which does not simultaneously perform transmission and reception comprising:

Specification at page 13, line 22:

~~The 30th invention~~ A still yet additional aspect of the present invention is the mobile communication device corresponding to simultaneous transmission and reception which simultaneously performs transmission and reception and non-simultaneous transmission and reception which does not simultaneously perform transmission and reception,

Specification at page 14, line 10:

wherein the antenna duplexer ~~according to 2nd invention~~ is used for said antenna connection circuit.

CLAIMS:

9. (As Amended) The antenna duplexer according to any of claims 1, or 3, ~~5, 6,~~ wherein said composite filter has an input terminal, an output terminal, at least one transmitting circuit and at least not less than one switching notch filter,

said transmitting circuit is electrically connected between said input terminal and said output terminal,

said switching notch filter is connected to at least either one of the input side and output side of said transmitting circuit,

said switching notch filter has at least one switch and at least one series resonance circuit,

one end of said switch is connected between said input terminal and said output terminal,

the other end of said switch is connected to one end of said series resonance circuit, and

said switch has a control terminal to switch ON/OFF.

15. (As Amended) The antenna duplexer according to claims 2 or 3, wherein said antenna switch is integrated with another switch connected to said antenna terminal.

25. (As Amended) The antenna duplexer according to any of claims 1, or 3, ~~5, 6,~~ wherein said composite filter has an input terminal, an output terminal, at least one transmitting circuit and at least not less than one switching notch filter,